Bulletin *of the* Green Section *of the* U. S. Golf Association

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A MONTHLY PERIODICAL TO PROMOTE THE BETTERMENT OF GOLF COURSES

ISSUED BY THE GREEN COMMITTEE OF THE UNITED STATES GOLF ASSOCIATION

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Address all communications to W. B. Lydenberg, Executive Acting Secretary, P. O. Box 313, Pennsylvania Avenue Station, Washington, D. C.

Editorial Responsibility

Much is said in regard to editorial privilege, less about editorial responsibility. Both prerogatives of the editorial office must be recognized and allowed to be exercised if any publication is to rise above mediocrity. The success of a periodical depends first of all on the character of the matter presented, and secondly on the manner of presentation. Moreover, there should be consistency in style of presentation. A publication of high standard where many writers are contributing can be maintained only by frequent and sometimes drastic use of the blue pencil.

It is a common characteristic of writers to wish to see their productions in print just as they were penned. This tendency is noticeably strong in the novice. As writers gain in experience they realize that the editor is their best friend. They not only learn to tolerate with unruffled humor the liberties which the editor takes with their manuscripts, but welcome the changes made.

Writers, like all fond parents, are peculiarly blind to the faults of their own offspring. The injunction "print it just as it is or not at all" is generally the trademark of a beginner in the literary game. It serves no useful purpose and frequently keeps out of print articles which if properly edited would be well worth using.

Standardized Accounting

At present it is very difficult to compare the maintenance costs of golf clubs because accounts are not kept according to any definite system and a great variety of work and items are included that have nothing to do with maintenance. The Committee hopes to put out in the future suggestions as to accounting which, if followed, will afford a basis for comparison of costs. If one 18-hole course is maintained for, say, $15,000, and another for $25,000 the difference should be accounted for, and if both accounts were kept on the same basis it would be easy to see where the differences occur.

The first thing to be considered is the classification of accounts and the distribution of maintenance items into as many classes as are practicable. Some of the classes are *seed, fertilizers, new machinery, repairs to machinery, supplies, water, horse feed, contingencies* and *labor.*

The Committee will welcome suggestions along these lines. The work will be greatly facilitated if each member club will send in a copy of its last year's statement, showing its distribution, with any suggestions that may be considered pertinent.

When we can establish a standard system of bookkeeping we will be in a fair way to eliminate useless expense.

Meeting of the Green Section Washington, D. C. July 21, 1921

During the Twenty-Fifth Open Golf Championship, which was played at the Columbia Country Club, Chevy Chase, Maryland, members of the Green Section present in Washington at the time held an informal meeting on the evening of July 21 in the grill-room of the Wardman Park Hotel. About 60 people were present. Prof. C. V. Piper, Chairman of the Green Committee of the U. S. Golf Association, presided.

In the opening address President Howard F. Whitney, of the U. S. Golf Association, presented a brief outline of the history of the U. S. Golf Association, and discussed in considerable detail the facts and factors that led up to the formation of the Green Section of the U. S. Golf Association. Mr. Whitney spoke in part, as follows:

"It appears from authentic records that Dr. W. S. Harban was the first golfer who went to the U. S. Department of Agriculture for technical assistance in regard to green turf problems. This was in 1906, when he first met Messrs. Piper and Oakley. Two years later when Mr. Charles B. MacDonald was building the National Links near Southampton, Long Island, he encountered such serious problems in attempting to grow satisfactory turf on the old sand dunes that he applied to the Department of Agriculture for help, which was of course accorded. In studying the difficult turf problems at the National Links, the Department scientists came to the realization that the existing knowledge on the subject was very far from adequate and that extensive experimental investigations were necessary. Unfortunately, no funds were available for the purpose; but in cooperation with many golf clubs a considerable amount of investigation was undertaken by the Department men. Much of the information thus garnered formed the basis for a long series of articles in the golf journals by Messrs. Piper and Oakley. The first appeared in January, 1913. These articles were immensely helpful, but in the meantime the needs of the golf clubs for information and advice were increased enormously. In the spring of 1915 the Executive Committee of the U. S. Golf Association waited on the then Secretary of Agriculture, Hon. David F. Houston, and requested additional help in solving the problems of greenkeeping. The committee pointed out that about $10,000,000 a year was being spent on the establishment and maintenance of turf by golf clubs, and it was believed that through ignorance half of the money was wasted. As a result of the appeal the turf experiments were begun at Arlington, in the spring of 1916, the results of which having already been of the highest value. An indirect response of the committee's appeal was the publication in January, 1917, of TURF FOR GOLF COURSES, by Messrs. Piper and Oakley, a work that has been of enormous assistance.

"About the time when the Executive Committee waited on Secretary Houston the Committee was urged to establish some sort of information bureau and perhaps publish bulletins by which needed and timely assistance could be rendered to golf clubs. The Executive Committee considered the matter but did not deem the time auspicious for undertaking additional responsibilities. In 1920 Mr. E. J. Marshall, of the Inverness Club, Toledo, Ohio, became strongly impressed with the great need of doing something

to help out in the various turf problems confronting golf clubs. His earnest and dynamic personality influenced many prominent golf enthusiasts, in particular, Mr. Hugh I. Wilson, and through their efforts the Executive Committee formally established the Green Section November 20, 1920. The first number of THE BULLETIN OF THE GREEN SECTION was issued February 10, 1921. The eager welcome with which it was received leaves no doubt that this new undertaking was one for which there was urgent need. So far as I can discern this is the first time in the history of sport that its devotees have established a journal purely to promote its growth and welfare. We feel that it marks an important landmark in the progress of golf."

Following President Whitney, Mr. W. D. Vanderpool, Secretary of the Association, made a brief address mainly in reference to the ravages of the brown-patch disease on fine putting-green grasses. This problem he characterized as the most serious that confronts the golf courses of the United States. Mr. Vanderpool described how they had checked the severe spreading of the disease at the Morris County course, in New Jersey, by spraying with Bordeaux mixture and by applications of sand and charcoal. His observation led him to the conclusion that the disease was more virulent on greens which had not the advantage of a free circulation of air, such as those near woods or in hollows. On the suggestion of their greenkeeper they are now about to experiment with applications of flowers of sulphur at Morris County in an effort to check the disease. All present were urged to conduct similar experiments on their own initiative and report the results to the Green Committee of the U. S. Golf Association for the benefit of all concerned.

The Chairman of the Green Committee, Prof. C. V. Piper, then addressed the meeting as follows:

"It seems fitting that on this occasion there should be presented a brief report on the progress thus far made by the Green Section and of the more important problems with which it is confronted. The evident record of its activities are the seven numbers of THE BULLETIN already issued. In the future, as heretofore, THE BULLETIN must be the chief medium of a mutual educational campaign that must necessarily be a continuous one. We must not underestimate the amount of repetition necessary to get the ordinary man to understand and to act intelligently. The work of preparing THE BULLETIN involves much time, and the Service Bureau entails a very large and increasing correspondence. Many letters of warm approval of THE BULLETIN and the Service Bureau have been received and seem to confirm the Committee's ideas as to the great need of the help it is furnishing.

"There are numerous requests from golf clubs for visits to advise them in reference to their turf problems. At the present time such requests can not be fulfilled, excepting as a member of the Committee may chance to be in the place. It would be highly desirable if the Green Section could afford the services of one or more competent specialists to travel and to assist golf clubs in reference to turf matters, but this is out of the question until its revenues are far greater than at present.

"Besides the problems limited to grass turf there are many others that confront green committees. Among them are *golf machinery, greenkeepers, buildings, golf architecture, landscaping golf courses, cost of construction,*

golf course management methods, training greenkeepers, golf courses at minimum costs.

"There is a large amount of knowledge based on experience in the possession of most golf clubs. It is proposed that this information be gathered by appropriate questionnaires and the data tabulated for the benefit of all interested. In addition it is becoming evident that in certain types of machinery at least we shall need careful comparative tests to determine the relative merits of each make.

"Cornell University has established a 4-year course to train men to be superintendents of parks, golf courses, large private estates, and the like. It may in addition provide a 2-year course to train greenkeepers. This action was taken in response to a memorial from the Green Committee pointing out the great need that exists. There is reason to believe that some other colleges will establish similar courses of study.

"In this informal meeting there is opportunity to discuss many things of interest to all. Everyone is urged to present any matter of interest that pertains to greenkeeping. At the present moment we are all keenly aware of the menace of brown-patch, the greatest single problem with which greenkeeping is confronted. It may be well to include it in our discussion.

"Until the Green Section enrolls every golf club in the United States, it can not exert its greatest influence. It is recognized that many of the clubs are poor financially, but even so we believe it will be true economy for them to join the Green Section. Manifestly we must make every reasonable effort to secure the enrollment of each golf club, for every one of them has something to teach the rest of us as well as much to learn."

The speaker then invited those present to inspect, while in Washington, the experimental turf plots which have been established by the Department of Agriculture at Arlington, where, among other things, treatments of brown-patch are being conducted and efforts are being made to condition soil so that it will not grow white clover, which has a marked tendency to displace creeping bent in putting greens. He alluded also to experiments under way to circumvent the ravages of brown-patch by seeding on the greens an annual grass, like crab-grass but with finer leaves, which is killed with the first frost but thrives on the greens during the period that the bents and fescues have succumbed; five or six such annual grasses are being tested. In referring to crab-grass he called attention to the fact that it is not altogether a nuisance. Imagine the fairways at Columbia at this time with the crab-grass omitted, and you would see only bluegrass languishing during the dry, hot weather of summer. As regards the eradication of crab-grass, though it will not thrive in shade and is killed by frost as well as artificial refrigeration, no practical or economical methods have been devised for the application of such remedies; neither will it withstand salt, and with this in view the Department is testing certain grasses that will grow in strong alkali soils for use on putting greens where by applications of salt the alkali grasses will thrive but the crab-grass perish.

Alluding to the invaluable work of Mr. E. J. Marshall in the organization of the Green Section, the Chairman then introduced Mr. Marshall, who pointed out the great benefits that can be derivd from the coupling together of the experience of the thousands of practical greenkeepers throughout the country with the technical knowledge rendered immediately available by the scientific men belonging to the Department of Agriculture who are whole-heartedly lending their support to the movement. The mediums

for the dissemination of this knowledge are THE BULLETIN OF THE GREEN SECTION OF THE U. S. GOLF ASSOCIATION and meetings of the delegates to the Green Section, such as this meeting. Of great value also are the district green sections and joint meetings of such district green sections, including visits of the delegates and greenkeepers to the various golf courses and discussing on the ground the many turf problems involved. Such district green sections have already been organized in Detroit, Philadelphia and New York. The good that can be accomplished in this way has already been demonstrated particularly in the case of the Detroit Green Section. Meetings of the delegates and greenkeepers should be held from time to time first at one golf course and then at another.

The meeting was then thrown open to general discussion.

Mr. Robert White, of the Wykagyl Country Club, New Rochelle, N. Y., gave his experience in combating brown-patch during the past season. The only remedy seems to be to spray with Bordeaux mixture. They conducted experiments on a small patch of putting green behind the clubhouse, leaving a small portion of the green untreated and the remainder was soaked with Bordeaux about twice a week during a period of several weeks. It seemed that thus the disease was held in check for quite a while, as the untreated green was injured badly; but after awhile the disease destroyed or badly injured the treated green also. As a result of this experience it became evident that Bordeaux simply checks the growth of the fungus and that spraying twice a week is not sufficient, as in the intervals the water washes the Bordeaux off of the grass leaves. He regards spraying with Bordeaux at least 90 per cent effective, but not 100 per cent. During the intervals between sprayings the grass grows to a certain extent and thus becomes unprotected by the Bordeaux. He considers, however, that when once the leaves are painted with copper sulphate the fungus can not find a foothold. This year he commenced spraying at Wykagyl about July 15, spraying 12 greens at a time and watering the others, so that for two nights out of the three the greens were sprayed and the third night watered. When the dry spell was ended he stopped watering and since then has been spraying every night. Ever since the hot spell started they have had brown-patch; the areas that are affected are tinted a slightly different shade of green but the injury is but very slight and scarcely detectable. They spray 18 greens with 100 gallons of Bordeaux mixture, and Mr. White estimates the cost at $5.00 a day to spray. One man can spray all of the 18 greens in 5 hours. A Bordeaux nozzle is used so that a fine spray can be produced.

Mr. W. Baird, of the Upper Montclair Country Club, Upper Montclair, N. J., reported that their experience has been about the same as that stated by Mr. White.

Mr. Albert D. Locke, of the Brae-Burn Country Club, West Newton, Mass., raised the question as to whether the brown-patch was actually a disease or not. In answer Prof. Piper explained in some detail, showing how that in the typical form of the phenomenon one will frequently find on a putting green early in the morning circular patches at the edges of which is a white mold about one-quarter of an inch high. This mold is made up of threads of the fungus, and it is an easy matter to make a pure culture from these threads by picking up a small quantity of the fungus and growing it on agar or gelatin. This fungus was determined at the Department of Agriculture to be *Rhizoctonia solani*, a fungus which is known to attack a great number of plants. Until it was thus studied at the Depart-

ment it had not been known to attack a grass, but it is now found to attack a large variety of grasses. With this pure culture grass growing in a greenhouse has been inoculated, and the disease produced in typical form. There are, however, certain turf plants that it does not attack, such as white clover, crab-grass, bluegrass and Bermuda grass. Efforts are being made to find a strain of bent that is immune to the disease. Quite a number of selections were made and multiplied, and as a result some have been obtained which are more resistant than others. No strain has yet been found that seems to be truly immune. The strain on No. 9 at Columbia apparently has a certain degree of resistance. The ideal thing is to find a grass which will make a good putting surface and that is immune to the disease.

The use of Bordeaux powder, dusting it on the ground, has been recommended for brown-patch. No information is at hand as to whether this is any cheaper than spraying the mixture. Experiments with the powder are now being conducted at Arlington.

Mr. George Sargent, of the Scioto Country Club, Columbus, Ohio, asked if there is any record of brown-patch damaging fairways as it does greens. Prof. Piper stated that the left side of No. 14 fairway at Columbia was seeded with bent grass, and that it is now badly damaged with brown patch, while the bluegrass adjoining is not affected.

Mr. William Tucker, of New York City, expressed the belief that brown-patch is caused by poor sanitation of the soil, stating that where the subsoil is of a sandy texture, thus permitting free ingress of air, the trouble does not occur, and also that wherever the drainage is imperfect the disease will work more harm. From the discussion that followed it did not appear, however, that this rule held good in all cases. Dr. Harban cited instances where a clay subsoil withstood the disease better than a sandy subsoil. Captain Clark, of the Engineers Country Club, has not observed that the sandy subsoil at Lindo Beach Club, Long Island, helped to check brown-patch.

Mr. J. A. Roseman, of the Westmoreland Country Club, Glenview, Ill., reported that they had obtained good results in combating brown-patch from an application of a solution of 3 pounds of corrosive sublimate and 3 pounds of muriate of ammonia in 5 gallons of water, this solution then thinned down by incorporating it into 50 gallons of water. After the solution is applied the greens are spiked about an inch deep so that air can permeate the soil. Cottonseed meal is then applied at the rate of about 100 pounds to a green, together with about 100 pounds of pulverized lime. Only one application is required. The application will, however, turn the greens off-color temporarily.

Dr. Oakley reported that there was some hope of effective results being obtained from applications of copper stearate, as it adheres better than Bordeaux mixture. Experiments are under way along this line.

Mr. Connellan reported that no trouble had been experienced with brown-patch at Grosse Ile, Michigan. The new ground and the isolation of this course may be the explanation.

Mr. White announced that he had marked success with the planting of vegetative material of grasses during the past spring at New Rochelle; the rows have now spread to a width of 3 feet.

Mr. Baird made reference to the eradication of *Poa annua,* from putting greens. He stated that Mr. Locke, of California, had reported success with the use of sale. Prof. Piper cautioned against the application of salt

to putting greens, and in any case it must be used with extreme care; he mentioned, moreover, that at Washington he regarded *Poa annua* as an asset, calling attention to the fact that it made beautiful greens in the early spring and then afterwards gradually disappeared for the balance of the season.

Mr. Sargent suggested that the liberal use of peat and manure might have a tendency to facilitate the spread of brown-patch. Dr. T. J. McClenahan, of the Washington Golf and Country Club, Rosslyn, Va., reported that there are greens on his course which have never had applications of these materials and yet are badly ravaged by the disease.

The lack of sufficient rolling of turf was then mentioned. Prof. Piper called attention to the fact that although only a few years ago there was a tendency to roll too heavily, there has since been a reaction and the tendency now is probably to roll too lightly. Mr. James L. Taylor, of the Ekwanok Country Club, Manchester, Vermont, stated that they practice heavy rolling on their sandy soils, but light rolling on the clay soils. If heavy rolling is not done, the sandy soils swell up very unevenly. They also spike the turf to facilitate aeration. Prof. Piper stated that agronomic experiments indicate that where there is satisfactory drainage soils are sufficiently aerated for the growth of roots without recourse to spiking.

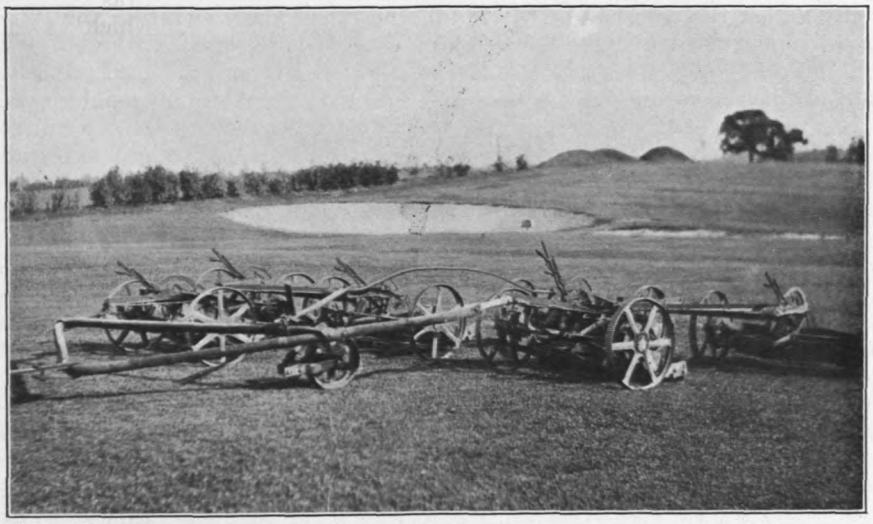
At the close of the meeting the Chairman announced that the regular meeting of the Green Section and its delegates would be held some time next winter, at the same time as the annual meeting of the U. S. Golf Association.

A buffet luncheon was served through the kindness of the Golf Association.

Improvising a Mowing Machine

W. C. Ferguson, *Glen Echo Country Club, Normandy, Mo.*

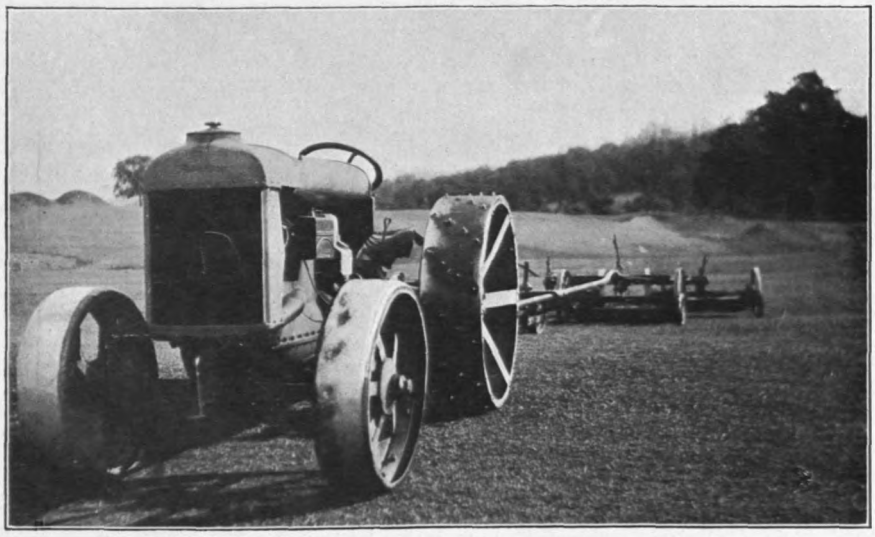
Horse-drawn mowing machines only were used for mowing fairways around St. Louis until last fall. As Grounds Committee for Glen Echo Country Club, we felt the need of machinery which was more reliable during hot weather and which after a prolonged spell of rainy weather and intensive growth would be able to get the fairways in shape more rapidly. With this object in view we looked over the machines on the market which would accomplish this purpose. Our first consideration was to get a machine which would not damage the course by packing or by tearing up the turf on the hillside during wet weather. The next quality we desired in the machine was reliability, for any equipment which could not be depended upon to "stay on the job" would be worse than a nuisance. Some of our members during trips looked over equipment being used on other courses, and while some of these outfits appeared to be doing satisfactory work they were all of very recent origin and insufficiently tested. We therefore decided to try out a well-known commercial tractor which we judged furnished the element of reliability, believing that if the treads of the wheels could be modified so as not to injure the turf it would likely be the best proposition available. It had the advantage of allowing us to use our two sets of triplexes, and the entire outlay would not exceed more than one-half of what was asked by some concerns for a complete mowing



Two triplex mowers connected to the tractor with tubular hitch. Glen Echo Country Club

outfit. The dealer was very glad to test his machine on our course for a month or six weeks.

We cut the flange off each back wheel and had a flat rim 8 inches wide put on the front wheels, as the radial rim of these front wheels could not be taken off. We first tried running without any cleats on the back wheels, but we found that slipping on dry spots were very objectionable. We then wound rope around the back wheels and found that in going up hills the rope would "yank" out the turf. We then tried putting cleats diag-



Tractor used at the Glen Echo Country Club. Note the altered front wheel and spiked rear wheel

onally across the wheels, but noticed the marks of these cleats on the fairways. Someone then suggested that we use spikes on the back wheels. We had these spikes made at the blacksmith's and put on the back wheels. They are bolted into the rivet holes that originally held the diagonal cleats. This arrangement has worked perfectly. We can get over the entire course in about two days. The outfit travels at the rate of about eight miles an hour, and has not been out of service more than a day for the entire year. We had a tubular hitch-belt after first trying one out which was built of wood to see that we had properly spaced the two triplexes which it had to pull.

There was at first some question as to whether the tractor, which weighs about 2,700 pounds, would crush down the grass on the fairways and rough, thus preventing the mowers from cutting it. We would say that we have never had any evidence of this trouble either in wet or dry weather. In fact, the wheels of the mowers leave the only tracks discernible behind the cutting outfit. This at first seemed strange to us, until we sat down and figured out the actual weight per square inch put upon the ground by the tractor and the mowing units. We were much surprised to find that the mowers put a greater load upon the turf than did the 2,700-pound tractor.

We are not in the tractor business ourselves, so having nothing to gain out of any compliments paid to the tractor we selected, but certainly we have received full value for the money expended in this machine, and any golf club that uses horses and would like to find a tractor to replace them would make no mistake in rigging up an outfit such as we have.*

Burning the Rough

Referring to the note on this subject on page 24 of No. 2 of this volume of The Bulletin, Mr. Charles P. Crowe, greenkeeper, Hermitage Country Club, Richmond, Va., has the following criticism to make:

"In The Bulletin of the Green Section for February 23, you say in what appears to be an editorial paragraph on page 24, 'it is quite probable that burning at least once in two years is helpful.' This statement will injure greenkeepers, especially in the South, where humus is so rapidly used up that turf maintenance is difficult. If none but us greenkeepers read the statement, less harm might result; but club members see or hear of it, and so are encouraged to set fire to any patch of grass or weeds that might baffle their way. I learned as a professor in an agricultural college to 'thank God for a good crop of weeds' after a crop was taken from a fertile patch. By mowing them and raking up all coarse material for the compost pile, all land can be kept nearer self-supporting. 'Burning the rough' is a crime of southern farmers, and I would be glad to see further articles about it in The Bulletin. Of course, I understand that there are times when I might gain something by burning a patch of rough, but insist in nearly every case (if not all) that the best way is to mow and hoe and rake and haul the stuff from where you don't want it to where you do."

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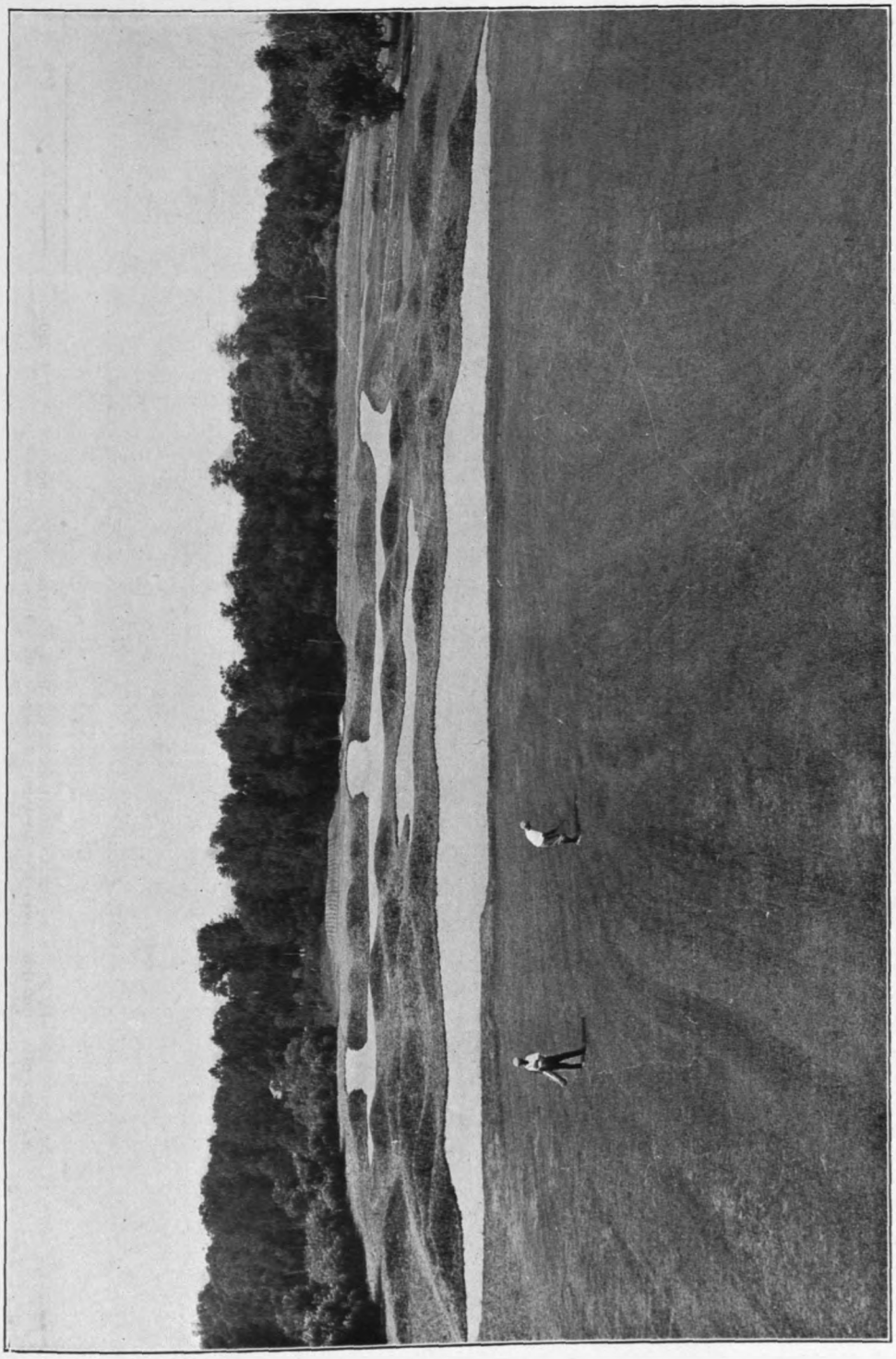
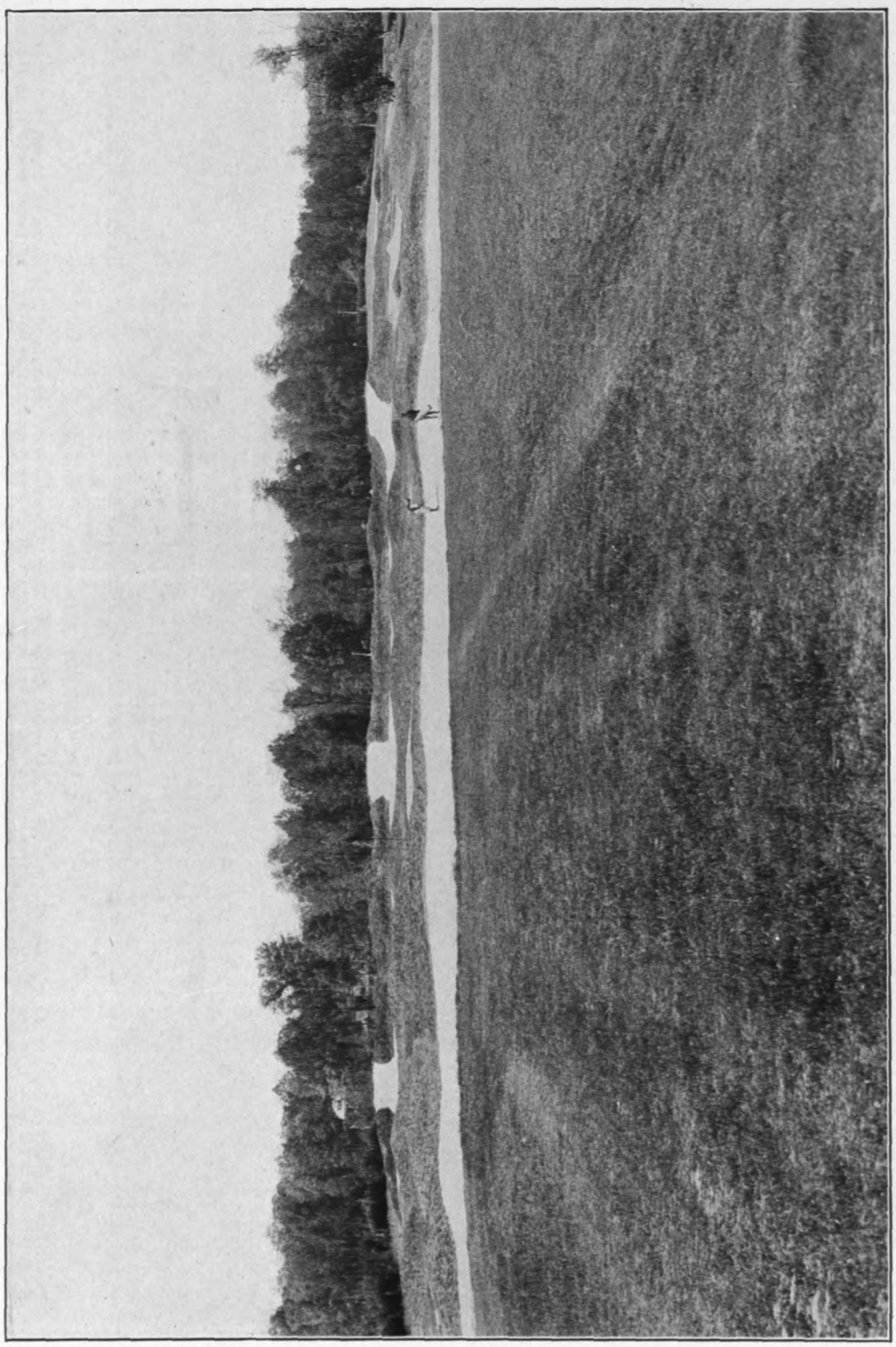
* There are now available on the market a number of tractors designed or modified for use on golf courses. The relative merits of each can be determined only through extensive comparative trials by competent judges. In the meantime the favorable or unfavorable experiences of the golf clubs will furnish data of interest to all.



A WONDERFUL BUNKER

The huge impressive bunker on the 3-shot 5th hole at Columbia Country Club, Chevy Chase, Maryland. It extends across the full breadth of the fairway and the carry is 75 yards at the narrowest and 90 yards at the broadcast crossing. Without doubt it is the largest bunker ever constructed on a clay-soil course. The putting green seen just to the right of the tall flat-topped tree is 200 yards beyond the bunker. This view is taken from an elevated platform. The player is about 300 yards from the tee.



A WONDERFUL BUNKER

Another view of the great bunker at Columbia Country Club showing how it appears to the player who has made a 250-yard tee shot. The player in the bunker got there on his second shot after a short drive.

Dear Bill Letter IV

Richland Center, N. Y., Aug. 14, 1921.

DEAR BILL:

A dog chasing his tail is making real progress compared with you. There's no sense in getting all "het up" just because your greenkeeper does not recognize you as the fountain-head of all knowledge. You must remember that you are about twenty-fifth in the line of chairmen that he has had to do with. He has seen them come and go like other animal pests, and without doubt he looks upon you as something to be endured with the best grace possible. You'll have to serve two or three years at least before you amount to anything; and he knows it. So don't get yourself all covered with lather because things don't go to suit you right off the bat.

After you've lived with your greenkeeper a year or so you will have a better notion of what he is up against and how he is trying to solve his problems; and on the other hand if you show that you really have the goods and know a little of what you are talking about he will commence to get your viewpoint and you two will get along fine.

When the chronic kicker on your board lets out his regular howl that expenses must be cut and it is all nonsense to spend so much money on the course, you'll feel there is no one on earth who has any sympathetic interest in you and your work except your greenkeeper, and you'll talk things over with him and get loaded up with facts and be prepared to floor your kicker friend at the first opportunity. They're all more or less alike, Bill, and you must get to understand them and think the way they think before you'll accomplish much. Don't forget your greenkeeper has probably forgotten more than you'll ever know; and when it comes to the practical end of the work, such as employing and handling men, laying out and completing work, getting the work done some how or other in spite of weather and what not, you will always be more or less useless. There's lots you can do to make yourself useful if you'll only set about it. It's a ten-to-one shot your greenkeeper is chock full of prejudices, whims, and fancies, and it's more than likely he would refuse to recognize a scientifically proven fact if he met it with a cow bell on it. While you are learning the game, see that he comes along with you; and when you think you have discovered something entitling you to a niche in the hall of fame, talk it over with him and find out how many holes he can blow through it. I'd be suspicious if he agreed with you about anything. If he does, you can make up your mind it's some fool thing that will not cost much and do little harm. After awhile you'll get on a working basis with your man so he'll really discuss the problems with you and try out his views on you. When you each begin to recognize that the other knows something and when you can scrap out your questions and troubles in a friendly way, then you'll be on a sound basis and you'll both be rendering real service to your club. Instead of going blindly along in the old-fashioned way, according to the old prejudices and fancies, you will be at least trying to reason things out, and you may find that two heads are better than one.

Another thing, Bill. Don't insist on carrying the flag over the ramparts. Don't try to get out in the spotlight. You may have helped create some praiseworthy result or condition, but the real work was done by the practical man. And see that he gets the credit that is due him.

You must remember also that your man has been tied down to his job for year after year and he has had no chance to get about and find out what others are doing. You get a line every day on your competitors; and it keeps you up-to-date and keen. There's every reason in the world why your man should get in a rut; but it's up to you to get him out and to keep out yourself. There's more to learn about this business than either of you realize; and if you'll both wake up to that fact and go at it together you'll make a great team and you'll both enjoy it. Take him with you to Washington some time and show him the grass plats at Arlington, and you'll both see more different kinds of grass and strains of grass than you supposed were in existence. Go together to some nearby city and spend a couple of days looking over the other fellow's course, and you'll both learn something. Try to understand that science has long ago demonstrated many facts, and that if you can learn the truth and apply it in a practical way you'll get results and save money. If some slick talker comes along and wants to spray your turf with an assortment of bacteria, you'll show him the gate instead of falling as a victim of conversation you don't understand.

I never met a greenkeeper yet who didn't know something worth learning, though some of them seem to think their secrets should be zealously guarded and be handed down to their sons. You'll enjoy listening to the "bunk" and stuff you'll get in response to your questions, and you two will enjoy many a laugh when you compare notes. Why, I had one top-notch greenkeeper solemnly tell me that a certain weed was grass turned foul from over-watering—and the melancholy part was that he believed it.

Bill, I'm getting awfully sick of wasting good advice on you. The soil is too barren to respond to the topdressing of the wisdom you ought to find in these letters. Hereafter instead of belly-aching to me about your troubles, go out to the barn and sit down on a box and figure them out with your partner.

If you two are going to spend from $15,000 to $25,000 a year of your club's money, it's up to you both to work together and hold directors' meetings—just the two of you—back of the barn or out around the course, so you can both understand and thrash out your problems; and if you can't agree, for the love of Mike don't call in an "expert." The expert will solve your problems without the aid of spectacles or a crutch; but if you set on his eggs your expected chickens will be ducks; or more likely the eggs will turn out to be China doorknobs.

Bill, don't bother me any more. I have trouble enough making my wife believe I know something without taking you on too. When you have served your novitiate and can think like a real greenkeeper we'll consider you as an applicant for the first degree; but you've got to choose your course, Bill, and do it quickly. You can either be an ornamental chairman and content yourself with pretty raiment, or you can learn the work and amount to something. I hope these few words will find you well.

Yours,

CHAUNCEY.

P. S.—Do all the clubs in your town belong to the Green Section of the U. S. G. A.? You ought to take it upon yourself to see that they do. Do it now!

Some Suggestions for Fall Treatment of Putting Greens

C. V. Piper and R. A. Oakley

In the sections of the country where the bents and fescues are the dominant putting-green grasses some work is required on the greens more or less continuously throughout the year. Spring, or the approach of spring, of itself suggests certain treatments to almost everyone, but the approach of fall does not seem to do so to a similar degree. Nevertheless, the fall is a good time to do certain kinds of work in connection with the maintenance of bent and fescue greens.

Weeding

During the growing season weeding is a never-ending operation, and it scarcely seems necessary to mention it specifically in connection with fall treatment. However, it is very important that weeds be removed from greens in the early fall, since at this season the weather conditions favor the growth of grass, and if the weeds are taken out the grass quickly covers the spots formerly occupied by them. Where crab-grass is troublesome (and this covers a very large part of the golf belt) special effort should be made to remove it. It is true, of course, that crab-grass is killed by the first frost, but if it has been allowed to make a good growth before this time the dead plants will result in vacant spots in the green unless they are removed in the fall. It is suggested, therefore, that crab-grass plants be pulled, raked, or cut out as early in the fall as possible. The removal of weeds from putting greens may be done incidentally to reseeding; but whether or not greens are reseeded, the weeds should in all cases be removed.

Reseeding

It is almost a universal practice to reseed thin or patchy greens at some time of the year, usually in the spring. But as a matter of fact, fall sowing is preferable to spring sowing, whether it is done on old turf or on a freshly prepared seed bed, except possibly in the northernmost part of the United States. Certainly, south of central New York the sowing of Kentucky bluegrass, redtop, and fine bents, and fescues in the fall is generally to be advised. Strictly speaking, these grasses are northern grasses. They thrive better in cool weather than in warm weather, and when sown early in the fall they make a good growth before being checked by the cold weather of winter. When spring arrives the young plants have stooled out and are in condition to grow rapidly. This enables them to compete fairly successfully with summer annual weeds. When seed is sown in the spring the young plants usually find favorable weather for a few weeks, but before they reach the stage when they have stooled to any considerable extent hot weather is upon them and they are not sufficiently active to win out in their fight against heat, drought, weeds, disease, and other pests. Briefly, this is one of the good reasons why seed of the northern turf grasses should in most cases be sown in the fall. The advantage of fall sowing will be better appreciated when it is recalled that these grasses are much the same as winter wheat in their temperature relations.

While sowing seed on thin turf is very commonly done, there is real

doubt as to its actual value in thickening the turf or in improving its quality. Like many other practices, there is too little definite evidence based upon properly checked tests to warrant the drawing of definite conclusions in connection with it. Usually reseeding is accompanied by scarifying and top-dressing, and it is probable that these features of the treatment contribute quite as much to the improvement of the old turf as does the seed. If at the time of reseeding representative parts of the greens were left for checks, some valuable information might be obtained. This is being done in a few cases, and it is hoped that more knowledge will be available on the subject in the near future.

In the absence of positive evidence of its benefits, the sowing of seed on thin turf is advised, and as an average date to do it September 15 should be kept in mind. If possible, bent greens should be reseeded with bent seed, and probably fescue greens with fescue seed, although it is a fact that bent seed germinates much more quickly than fescue seed, and the young bent plants are more hardy and aggressive than the fescue plants. Bent seed, however, is not abundant at this time. Because of this it has been suggested by some that redtop seed be substituted. Redtop, as is well known, is a coarse grass not suited for putting-green purposes except in its early or seedling stage, but those advocating its use argue that the plants resulting from reseeding on old turf succomb to the conditions that exist there while they are still in the seedling stage. Limited observations seem to substantiate this contention, and while it does not seem advisable to recommend the practice definitely, it would seem advisable to try it at least on a small area.

Since redtop plants do not last long under putting-green conditions, of course no permanent benefit to the green is to be expected. But redtop seed is cheap, and reseeding might be done advantageously both spring and fall, thereby maintaining a succession of seedlings.

The best methods of reseeding that are now practiced involve the scarifying of the turf by some satisfactory means, the mixing of the seed with compost before it is sown on the greens, and the top-dressing of the reseeded greens with compost immediately after reseeding. Light rolling and watering should follow. By mixing the seed with compost better conditions are produced for the germination of the seed and the growth of the seedlings than where seed is sown by the ordinary methods. A liberal quantity of seed should be used, but more than 3 pounds of good bent seed or 5 pounds of red fescue seed for 1,000 square feet is not recommended. If redtop is used, 3 pounds of recleaned seed should be ample.

Special seeders have been constructed to reseed old turf, but experience has not demonstrated their usefulness. In fact, it appears that the method here suggested is preferable to those in which the use of special seeders is involved.

Aerating the Turf

Much has been said with regard to the importance of aerating the turf especially in the spring and fall, and many implements have been devised for this purpose. These have been of the nature of disks, spiked rollers, and spiked tampers, but the evidence so far is not favorable to them. Some have advised the partial lifting of turf by means of a spading-fork and the sifting of compost under the lifted layers. This practice may give good results ultimately but it has at least two objections. First, it is difficult to

get the turf back in good condition for play after forking; and secondly, the plants whose roots are pulled loose from the soil usually die and therefore streaks of dead grass are left through the green. Those who are impressed with the recommendations they hear regarding forking are advised to try the method on a small scale for their preliminary experiments.

Overcoming the Effects of Brown-Patch

The occurrence of brown-patch makes fall treatment of some kind imperative; and while very little is known with regard to the best methods for producing recovery of the turf, preliminary experiments indicate that top-dressing with a compost to which some quick-acting fertilizer, such as nitrate of soda or sulphate of ammonia, is added at the rate of approximately 3 pounds to each 1,000 square feet, is the most successful treatment thus far known. Brown-patch sometimes kills the grass outright, and in such cases it is practically necessary to returf these areas by sodding.

Fertilizing

Whether or not reseeding is done, or brown-patch has been prevalent, the green should be top-dressed in the fall. It is probable that good compost to which nitrate of soda or sulphate of ammonia is added is, everything considered, the most satisfactory dressing to use at this time. A second top-dressing of compost, to which no mineral fertilizer is added, should be given late in the fall, and this should be followed somewhat later by a dressing of sand if the greens are on clay soil. The sand leaves the surface in good condition for winter, probably chiefly by improving the drainage at the crowns of the grass plants.

There appears to be a possibility of over-fertilizing turf in the fall, and at best no advantage is derived from heavy applications, especially of nitrogenous fertilizers, at this time of the year.

Drainage and Sodding

Particular attention should be given to drainage before the severe weather of winter arrives. Unless both surface—and under-drainage are good, the turf is subject to damage by heaving, which is brought about by alternate freezing and thawing during the winter and early spring. Look after the drainage. Where sodding is to be done for patching or for the remaking of greens, the fall of the year is a good time to do it; the grass will stand more severe treatment in the way of transplanting at this time than at any other time of the year.

Earthworms

Earthworms frequently are very troublesome during the fall, and greens thus infested should be treated as suggested in previous articles in this BULLETIN so that the damage from earthworms during the fall and winter may be reduced to a minimum.

Rhode Island Bent Seed Situation

LYMAN CARRIER

When the blockade of Germany in the fall of 1914 put an end to shipments of mixed bent seed to this country I was assigned the task of trying to help revive the Rhode Island bent seed industry in New England. Each summer since then until the present I have spent from two or three weeks to as many months on this problem. It may be of interest to the readers of this BULLETIN to learn what has been attempted and the difficulties in the way of securing an adequate supply of home-grown bent seed.

There is a considerable amount of Rhode Island bent grass growing in New England. If it were all harvested it would probably supply the present demand for this seed. A New York seed firm sent an order early in the war to a New Zealand jobber for a shipment of Colonial redtop seed, which is the same grass as Rhode Island bent. The New Zealand jobber wrote back, "There must be some mistake in placing this order, for our botanist informs us that this grass is found in abundance all along the North Atlantic Coast of your country." He received a cable message to fill the order immediately.

The questions naturally arise, If this grass is in New England in sufficient quantity why is the seed not harvested and on the market? Why are we dependent on foreign countries for our seed? The chief reason why the seed is not harvested in New England is the human element involved. Visitors to southern Germany report that the mixed bent seed which comes from there is gathered mainly in small quantities by women and children. These small amounts were sold to local dealers for a pittance and are gradually collected into the seed exporting centers where they aggregate thousands of pounds. If we turn to New England it is readily apparent that the conditions there are entirely different from those in Germany. There are few women and less children in New England in the rural districts where Rhode Island bent grows. Any one with sense enough to strip grass seed has had steady employment during the past few years in the cities at good wages.

The past history of the Rhode Island bent seed harvesting in New England throws much light on the lack of initiative and interest in the subject on the part of the New England farmers. Something like thirty or more years ago considerable Rhode Island bent seed was saved. A few farms were equipped with threshing outfits. This business was killed partly by the German competition but more by the unscrupulous practice of selling redtop seed as Rhode Island bent seed.

Prof. Hillman has quite effectively stopped this latter fraud, and since 1915 there has been little seed sent over from Germany. How soon the Germans will be able to supply the demand in this country is problematical. It is apparent that much of the sod over there which produced bent seed was plowed up during the war, and, unless they are more enterprising than our farmers in seeding it, several years will pass before the land will be back again in bent grass.

Our efforts have been directed toward working out methods of harvesting, taking into consideration the status of farming in New England. Stripping machines like those used in harvesting bluegrass were first tried but not successfully. The stems of bent are not tough enough to withstand

stripping, and so much straw is gathered that it requires threshing to separate the seed. The only practicable means of gathering the seed appears to be to cut the grass when the seed is ripe, which is about the first of August, cure and stack it as for hay, and then thresh it with an ordinary grain threshing machine.

After a great deal of energy was wasted trying to induce the New England farmers to gather bent seed, a lumberman who owned several abandoned farms was finally pursuaded to undertake harvesting this seed in 1920. He was well supplied with teams, mowers, and other hay-making machinery, but the threshing outfit was more difficult to provide. Grain growing in New England passed out of existence simultaneously with the opening up of the Great Plains region, and all threshing machinery up there is in the last stages of decay. We finally found a machine which looked as if it might be made to operate and we proceeded to arrange for harvesting bent seed. Then we found our troubles had only nicely begun. It was necessary to use screens in the threshing machine with one-eighth inch mesh in order to save all the seed, and this gave us an enormous amount of trash and chaff which had to be screened out. It would not have been a difficult undertaking if a power cleaning machine had been available, but no such machine could be found in New England and it was impossible to get one shipped from the factory on account of the freight embargo and express company regulations of 1920. The seed was put through a hand cleaning mill with screens as fine as 28 meshes to the inch. Screening several tons of chaff and seed through a hand mill is a slow, laborious job. Moreover, it takes more brain-power than is possessed by the average New England farm laborer to clean the seed without wasting a large part of it in the screenings.

"Ill fares the land to hastening ills a prey,
Where wealth accumulates and men decay."

This grass grows in small lots over quite a stretch of territory around Narragansett Bay. Much of it is cut for hay, and we found the most practicable arrangement was to select the fields in July from which the seed was to be gathered. At that time of the year it is not difficult to distinguish Rhode Island bent from redtop, another grass common in New England. In most cases the owner would agree to defer cutting the grass until after the seed was ripe and grant us the privilege of threshing it on payment of about the rental value of the land, the farmer figuring that the straw would pay him for the labor of cutting and stacking the grass.

Yields

This grass makes a light growth in New England. It should be noted that it is a volunteer crop, mainly on old meadow or pasture fields. No Rhode Island bent of consequence has been seeded as a farm crop in many years. One-fourth to one-half ton of hay to the acre is all the crop will average. From this should be threshed ten to fifteen pounds of seed—that is, the seed after it has been cleaned to 40 or 50 per cent purity. Small experimental areas where the grass was cut with a scythe and the grass carefully gathered and cured on a tight floor have given larger yields of seed than those stated above, which leads one to think that with improved machinery it might be possible to get more seed out of the crop than we did last year. Still, the Whitney farm, on Prudence Island, which has something like 700 acres of Rhode Island bent and which was one of the last

to be given up for harvesting the seed, never produced more than 3,500 pounds in a season.

What is Needed

Any one who wishes to go into the Rhode Island bent seed gathering business has a wide, open field free from competition. But before attempting to harvest the seed, a first-class modern threshing outfit and a power cleaner should be provided. An experienced thresherman, preferably from the redtop area of southern Illinois, should be put in charge of the outfit. The rest of the labor needed can be supplied in New England, such as it is. It will not be necessary to buy an engine to run the threshing machine, as a Ford with one of the numerous "Helping Henry" devices for converting the "Lizzie" into a stationary engine, makes an ideal source of power, as it is highly essential to be able to regulate the speed of the cylinder of the threshing machine according to the condition of the grass.

Whether any one goes on with this work depends a great deal on the price which can be obtained for the seed. If there was any certainty of receiving $1.00 or better a pound for the seed in New England, a great deal, I feel sure, would be harvested. Otherwise, I doubt if any further effort will be made in harvesting it. While this price may appear exorbitant compared with 45 cents a pound before 1914, yet much of that 45-cent seed was Illinois grown redtop which could have been bought as redtop for less than 20 cents a pound. The rest was harvested in southern Germany under conditions which do not prevail in this country. We really haven't had any Rhode Island bent on the market before for many years; so no comparison can be made.

One Thing Leads to Another

LYMAN CARRIER

The treatments to eradicate earthworms developed by golfers appear to offer a practical application connected with poultry raising. Recent investigations have demonstrated that earthworms are hosts to the eggs of the worms which cause gapes in chickens. The gapeworm is a parasite about one-half inch in length and hatches from eggs in the digestive tract of a small chick, afterwards reaching the windpipe, where it attaches itself to the inner lining. As it grows, especially if there are several gapeworms present, the chick has difficulty in breathing. The characteristic gaping is an effort to get air into the lungs. The rest of the life-cycle of the gapeworm is as follows. The worm grows from blood sucked from the chicken and becomes filled with eggs, the body bursting when mature. These eggs, if the chick has not died from suffocation in the meantime, are coughed out on the ground. The evidence does not indicate that chicks are directly infected with these eggs. But earthworms, in masticating the soil, pick them up; and when the earthworms are a little late in returning to their burrows after a night's carousel, or when they come to the surface for a breath of fresh air during rainy weather, they may be devoured by the chicks.

The only preventive remedy for gapeworms hitherto has been to keep the chicks off gape-infested land. It is generally considered that it takes three years to free a chicken run from gape infestation. By using some of the earthworm poisons it ought to be possible to clear the soil from this pest in a much shorter period of time.

Questions and Answers

All questions sent to the Green Committee will be answered as promptly as possible in a letter to the writer. The more interesting of these questions, with concise answers, will appear in this column each month. If your experience leads you to disagree with any answer given in this column, it is your privilege and duty to write to the Green Committee.

1. *I would like to have your opinion as to the best methods of getting rid of crab-grass. Would you recommend cutting it out early in the season or raking down later? Also, what fertilizer would you recommend for use on a green which has been troubled previous seasons with crab-grass? E. H. B., Massachusetts.*

We regret to say that we have found no easy method of eradicating crab-grass from turf. In fact, about the only method that has proved successful is hand-weeding, and where this method is followed and the greens are protected from overwash from the rough and fairway, the crab-grass problem usually lessens in importance from year to year. We have tried a great many experiments with the hope of finding some treatment that would obviate the necessity of so much hand work, but our results so far have been almost entirely negative. The reaction of crab-grass to fertilizers is such that there appears to be no fertilizer that will give the desirable turf grasses material advantage over crab-grass. There is an advantage, however, in fertilizing the greens properly. The advantage lies in the fact that if this is done it is possible to keep the desirable turf grasses in vigorous condition, and by a few years' careful pulling out of crab-grass very little of it appears in the greens thereafter, provided, of course, good treatment is given the greens.

2. *We have been troubled with crab-grass, which is a pest on our greens, propagating only from the seed. In other words, all roots are entirely winter-killed, and the grass only comes next year from the seeds remaining in the greens. The article in the May 28* BULLETIN *neither confirms nor contradicts this fact. Can you give us definite information on the subject, as such information would have a bearing on our treatment of the greens and would seem to the writer to simplify the problem considerably? A. T. S., Maryland.*

Both of the crab-grasses in northern latitudes are purely summer annuals, being killed by the first frost, a statement which you will find at the end of the first paragraph in the article on crab-grass on page 88 of THE BULLETIN. In the tropics the plants live more or less indefinitely, as the decumbent stems root at the nodes and really make new plants. In this latitude all of the plants that appear each year come from seed in the soil or which has blown there or been carried there. We have recommended that putting greens, in general, be so constructed that crab-grass seed can not wash or blow on the green, and that building with attention to this matter reduces the amount of crab-grass seed which reaches the putting green very materially. In addition, in late summer and fall all of the crab-grass in the immediate vicinity of the green should be kept closely mowed so that it does not make ripe seed, which is readily blown on the putting

greens. Attention to these two things we believe does materially reduce the amount of crab-grass, but even in spite of such precaution enough of it reaches putting greens so as to cause a great deal of weeding every year. On the fairways, in the latitude of Washington at least, crab-grass we regard as a distinct asset. During hot, dry weather in midsummer bluegrass and most other fine grasses suffer severely, but the crab-grass enjoys such weather and thrives. If you could see the fairways of the Columbia Country Club at the present time (July), for example, you would realize how much the crab-grass helps the fairways and how much poorer they would be if it were not for the crab-grass.

3. *We are bothered with grasshoppers eating our greens and doing serious damage on many of them. We have not been successful with the various poisoning methods and are now looking around for some sort of a grasshopper catcher. Do you know of any? G. M. M., Michigan.*

We do not know of any grasshopper trap which could be operated effectively on golf links without the use of horses, and doubt very much if a trap of this kind has as yet been proposed which could be used effectively for this purpose; they are, however, fairly effective when used on smooth, level ground, such as occurs in the western prairies. The experience with the standard poison bait for grasshoppers has been so uniformly favorable that we are led to guess that if you have applied this bait without success it has not been properly prepared and applied. This bait is generally regarded as the ideal remedy for grasshoppers on golf courses and it should be given a thorough trial before any other method is considered. The formula as generally used is as follows: Wheat bran, 25 pounds; Paris green or white arsenic, 1 pound; lemons or oranges, 6 finely chopped fruits; low-grade molasses, such as refuse from sugar factories, or cattle molasses, known as "black-strap" molasses, 2 quarts; water, 2 to 4 gallons, according to meteorological conditions. The poison and bran should be thoroughly mixed while dry, the fruits finely chopped and added to the same, and lastly the diluted molasses is poured over the bait, and the whole thoroughly mixed. When ready, the bait should be moist, but not sloppy in consistency. The amount of poison bait mentioned is sufficient to treat about three acres when the grasshoppers are young; later on, when they are larger, the amount will suffice for about five acres sown broadcast in strips about a rod apart. The ordinary amount usually applied broadcast uniformly is from five to ten pounds per acre. In many cases the addition of the fruit has been found to be unnecessary, especially where a strong-smelling molasses can be obtained.

4. *Can you recommend a good sprinkler for watering greens and give the name of a dealer? The greens in respect which I ask this information are watered from a tank about 30 feet high. H. F. M., New York.*

As stated in No. 4 of THE BULLETIN, there are a large number of different sprinklers on the market, but at present we have not the data to enable us to express an opinion as to which is the best. In the near future we hope to assemble and compile the experiences of many clubs and also to test out by accurate experiments the efficiency of a large number of sprinklers. There are several which are regarded as being satisfactory (names and dealers given in personal letter).

5. *Information has reached us that watering greens every night to a certain extent, or every other day, is not as beneficial as giving them a thorough soaking once every five days or every week. The top layer of soil in the greens is composed of six inches of csreened top-soil (which is a very white clay), humus, and sand, used in equal parts. Below that there is a layer of well-rotted stable manure, then cinders, and the greens are tiled. What is your advice as to watering? N. A. Y., Indiana.*

The consensus of opinion seems to favor infrequent heavy watering rather than light watering every day or every other day. From the manner in which your greens are constructed, however, we do not think it would be advisable to delay watering more than three or four days at a time, especially during hot, dry weather.

6. *We are quoted fancy recleaned redtop seed showing a purity of 98 per cent and germination of 98 per cent at $25.00 per 100 pounds and some showing a purity of 94 1/2 per cent and germination of 96 per cent at $22.00 per 100 pounds. We would like to know which of the above lots it would be advisable to purchase. R. A. Y., Indiana.*

We would advise the lot showing a purity of 98 per cent. The difference in price is small, and doubtless there are appreciably fewer weed seeds in the first lot than in the second.

7. *Can you advise us as to a particular kind of seed for use on fairways which will survive the combat between the native prairie grass and the grass resulting from such seed? We desire to repair our fairways, which consist of prairie turf, by seeding down in some of the thinner spots and bare patches with seed that will do well along with the native grass. Is there any such seed as desired? I might add that the prairie soil here is slightly alkaline. D. C., Alberta.*

We fear you will have considerable difficulty in getting satisfactory results unless you are able to irrigate your fairways. If this can be done we are quite sure you will have little difficulty in getting bluegrass established. Bluegrass does well on soils such as yours provided moisture is reasonably abundant. Efforts, however, to improve native sod where moisture is not reasonably abundant have not been very successful. Practically all of the available grasses have been tried and none give good results. Generally speaking, the best fairway mixture for Canada is bluegrass and redtop. The redtop makes quick growth and the bluegrass comes on later.

8. *What seed is best for a new green, to be made this fall, on clay land, to be used only for the coming season? A. F. H., Ohio.*

Since seed of the bent grasses and red fescue is expensive and difficult to procure at this time we are inclined to advise the use of redtop. Redtop makes a good putting surface when the plants are in the seedling stage, and if seeded this fall your greens should be in good condition for play next spring. It has been suggested that a succession of redtop seedlings can be maintained on greens by reseeding spring and fall. After the redtop has passed the seedling stage it is too coarse for putting greens, but we

think you will be able to maintain very good greens of redtop from the spring of 1922 until August or the first of September of that year. Seed should be sown some time during the month of September, preferably by the middle of September in your locality. Please bear in mind that we do not ordinarily advise redtop as a putting green grass, but under the conditions you mention and with bent seed not easily available we think redtop will probably serve your purpose very well.

9. *As the fescues and bents are not so likely to be attacked by the brown-patch disease when sowed with other grasses, would not a mixture of New Zealand fescue, creeping bent, redtop, and bluegrass make up a very fair putting green? F. P. Q., Nebraska.*

While it appears to be true that the disease does not injure mixed cultures quite as badly as pure strains, the advantage of pure strains in putting greens is such as to justify a considerable effort to establish them. We would not advise you to sow the mixture suggested in your letter. Redtop and bluegrass are not nearly as desirable turf grasses as Chewings fescue or the fine bents, and we are convinced that the bents will prove superior to either of the commercial red fescues for your conditions. Redtop and bluegrass make a good combination for the fairway, but it is only when the seed of other grasses cannot be procured that we advise their use on putting greens.

10. *Our greens were planted with a mixture of red fescue and redtop. We now have almost a pure strain of red fescue. In the last six months clover has been creeping into the fescue. We have been letting our greens grow quite long but would like to cut them short in order to kill off the clover. Whenever we have tried to cut the fescue short we have gotten into trouble, requiring two to three months' time to get them growing well again. Our greens are of a very sandy texture and undoubtedly low in growing elements. Is it the fault of our greens or is it characteristic of fescue that it will not stand short cutting? J. W. H., Ohio.*

It has not been our experience that red fescue is troublesome to keep cut short. Your difficulty is probably due to letting the grass get too long before the short cutting commences. We find that it pays to start in as soon as growth begins in the spring, keeping the grass down to the proper height. When once the grass gets above good putting height it takes considerable time to produce the right condition. It is not advisable to cut it short all at once; but by gradually lowering the cutting knives, in a week or ten days it should be down to the proper height without injury to the stand of grass.

11. *Have you any information available concerning the so-called "bacterized humus" which is being offered for sale by a concern in ——? J. B. S., Michigan.*

The best opinions we have obtained tend to show that this material falls far short of the claims that are ordinarily made for it. Our views on humus and its use were fully discussed in the article entitled "Humus-Producing Materials and the Making and Use of Compost," on page 51 of this volume of THE BULLETIN.